Washington's K-12 STEM ED Report

Federal Funding for K-12 STEM Education: An Urgent National Priority — Our future depends upon it!

JOBS, OUR STANDARD OF LIVING, AND NATIONAL SECURITY: Advances in science and engineering are essential for ensuring America's economic growth and national security. During the next decade, U.S. demand for scientists and engineers is expected to increase at four times the rate for all other occupations. But today's high school students overall are not performing well in math and science, and fewer of them are pursuing degrees in technical fields.

Congress has an opportunity to help close this alarming gap. We applaud the House and Senate for establishing **Math and Science Partnerships** as part of the *Elementary and Secondary Education Act* to improve teacher quality and student achievement in these subjects. These partnerships between school districts, universities, businesses, and education organizations enjoy bipartisan support and will be critical for improving K–12 science and math education across all states and school districts. We also urge Congress to support the portfolio of STEM education programs at the National Science Foundation (NSF) and the NSF *Math and Science Partnerships* whose aims are to improve teacher quality and student achievement in these areas.

FEDERAL INVESTMENT IN K-12 SCIENCE & MATHEMATICS EDUCATION HELPS KEEP OUR ECONOMY COMPETITIVE: Without public funds invested in K-12 science and mathematics education, there can be little or no basis for future job growth and our national security will be imperiled. Over the past 50 years, taxpayer **investment** in science and mathematics education has indirectly produced more than half of the nation's economic growth. Prominent economists agree that no other investment generates a greater long-term return to the economy than scientific R&D, and that starts with educational systems. Research, education, the technical workforce, scientific discovery, innovation and economic growth are intertwined. To remain competitive on the global stage, we must ensure that each remains vigorous and healthy. That requires sustained investments and informed policies that will strengthen our K-12 mathematics and science education system.

HOW Washington K-12 SCIENCE & MATHEMATICS EDUCATION COMPARES: Washington ranked 7th in the nation on the 2005 NAEP scores for mathematics with a score of 285 (national average was 278). In 2004, Washington did not report on the percentages of middle school math and science teachers who were certified (the national average was 49% for math and 54% for science teachers). 6% of Washington's 12th grade students took the AP Calculus exam in 2004 (the national average was 7%). Washington assesses students in grades 3, 4, 6, 7, 9, and 10 for math and in grades 5, 8 and 10 for science.

U.S. VERSUS INTERNATIONAL STUDENT ACHIEVEMENT IN MATHEMATICS AND SCIENCE: For the 2003 **Trends in International Mathematics and Science Study (TIMSS)** — an international student assessment conducted in 45 countries — the Mathematics score for American grade 8 students was 504, which exceeded the international average score of 466. The Science score for American 8th graders was 527, which also exceeded the international average of 473. Although there was a significant improvement in the mathematics and science scores between 1995 and 2003, ***U.S. students were still outperformed by students in other countries in mathematics and science.***

TIMSS Average Science Scale Scores of Eighth-grade Students, by Country: 2003

Country	Average Score
International average	473
Singapore	578
Chinese Taipei	571
Korea, Republic of	558
Hong Kong SAR	556
Estonia	552
Japan	552
Hungary	543
Netherlands	536
United States	527
Australia	527
Sweden	524
Slovenia	520
New Zealand	520
Lithuania	519
Slovak Republic	517
Belgium-Flemish	516
Russian Federation	514
Latvia	512
Scotland	512
Malaysia	510
Norway	494
Italy	491
Israel	488
Bulgaria	479
Jordan	475
Moldova, Republic of	472

PISA Results: Results from the 2003 **Program for International Student Assessment (PISA)**, which focuses on the performance of U.S. 15 year-olds in mathematics literacy and problem solving compared to their peers in 38 other countries, shows **U.S. performance in these areas was lower than the average performance for most Organization for Economic Cooperation and Development (OECD) countries.**

See http://nces.ed.gov/timss/Results03.asp **and** http://nces.ed.gov/surveys/PISA/PISA2003hghlights.asp

TIMSS Average Mathematics Scale Scores of Eighth-grade Students, by Country: 1995 and 2003

Country	1995	Country	2003
Singapore	609	Singapore	605
Japan	581	Korea, Republic of	589
Korea, Republic of	581	Hong Kong SAR	586
Hong Kong SAR	569	Japan	570
Belgium-Flemish	550	Belgium-Flemish	537
Sweden	540	Netherlands	536
Slovak Republic	534	Hungary	529
Netherlands	529	Russian Federation	508
Hungary	527	Slovak Republic	508
Bulgaria	527	Latvia-LSS	505
Russian Federation	524	Australia	505
Australia	509	United States	504
New Zealand	501	Lithuania	502
Norway	498	Sweden	499
Slovenia	494	Scotland	498
Scotland	493	New Zealand	494
United States	492	Slovenia	493
Latvia-LSS	488	Bulgaria	476
Romania	474	Romania	475
Lithuania	472	Norway	461
Cyprus	468	Cyprus	459
Iran	418	Iran	411

Average is higher than the U.S. average
Average is not measurably different from the U.S. average
Average is lower than the U.S. average

K-12 STEM* ED Report Card: How Washington Ranks

** STEM Ed = Science, Technology, Engineering & Mathematics Education*

Rank	Significant Education, Scientific or Economic Indicator	Washington	National Average
	Latest Educational Test Scores for Science & Math		
	NAEP Scores (Natl. Assessment of Educ. Progress) [1]		
7	2005 Grade 8 Mathematics Average Score	285	278
4	2005 Percentage "At or Above Proficiency" in Math	36%	29%
NA	1996 Grade 8 Science Average Score	150	148
	ACT Scores 2005 [2]		
2	Washington's 2005 Average Science Score	22.3	20.99
5	Washington's 2005 Average Math Score	22.4	20.93
36	Percentage of Graduates Taking ACT in 2005	16%	45.61%
	SAT® Scores & Advanced Placement® (AP) Percentages 2004 [3]		
25	Washington's Average SAT Score	1,059	1,026
21	Washington's Percentage of Graduates Taking 2004 SAT	52%	40.18%
29	AP ** **Science Exam** — Percentage of 12th Graders Taking	6%	8%
24	AP **Calculus Exam** — Percentage of 12th Graders Taking	6%	7%
16	AP **Chemistry** — Percentage of 12th Graders Taking	2%	1%
14	AP **Physics** — Percentage of 12th Graders Taking	2%	1%
	Grade 9-12 Course Enrollments as % of All Students [4]		
NA	**Formal Math** — % of High Schoolers who took (All topics & levels)	unreported	78%
NA	**Chemistry** — % of High Schoolers who took 1st year Chemistry	unreported	13%
	Teacher Quality Indicators (K-12) 2004 [4]		
NA	Percentage of Middle Level Science Teachers Certified	unreported	54%
NA	Percentage of Middle Level Math Teachers Certified	unreported	49%
NA	% of HS Chemistry Teachers with Main Certification in Chemistry	unreported	53%
NA	% of HS Math Teachers with Main Certification in Math	unreported	79%
	NCES Key Educational Statistics (latest) [5]		
34	Expenditure per Pupil 2002 - 2003 School Year	$7,292	$8,073
30	% Change in Expenditures per Pupil 1982-2002	+ 50.84%	+ 53.5%
18	Average Annual Salary of Instructional Staff 2002	$43,483	$44,604
12	Enrollment in Public Elementary & Secondary Schools, 2003-2004	1,021,349	47,201,722
36	Percent of Students in Title I Schools	41.3%	49.3%
16	Public higher education current-fund expenditures, 2001 (millions of dollars)	$7,306	$170,024
9	Percent Change in Public School Enrollment K-12 (1982 -2002)	+ 34.7%	+ 18.3%
	Public Elementary & Secondary Schools Data 2003 - 2004 [5]		
21	Number of School Districts	296	14,383
14	Number of Schools	2,251	96,143
47	Pupil / Teacher Ratio	19.3	15.47

K-12 SCIENCE & MATH EDUCATION IS ESSENTIAL FOR A SKILLED WORKFORCE. Of the 20 fastest-growing occupations projected through 2010, the U.S. Bureau of Labor Statistics concludes that 15 of them will require substantial Mathematics or Science preparation. A series of reports from key business groups, scientists, and educators proposes a number of actions that must be undertaken NOW to improve K-12 Science and Mathematics so that we can ensure our students have the skills to compete in the world economy. These actions will be critical to maintaining our nation's economy, quality of life, national security, and future scientific and technological innovations. For more information: http://www.nap.edu/books/0309100399/html ; http://www.businessroundtable.org/pdf/20050803001TAPfinalnb.pdf ; http://www.bhef.com/MathEduReport-press.pdf and www.aboutastra.org

Sources: **1. U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, *National Assessment of Educational Progress (NAEP) 2005 (Mathematics)* and *2000 (Science)*; 2. ACT, Inc.; 3. The College Board; 4. Council of Chief State School Officers (CCSSO) and State Departments of Education, Data on Public Schools, 2003-2004; and 5. U.S. Department of Education, National Center for Education Statistics. AP ** = Advanced Placement.**